

REMARKS

Claims 13 and 27 have been amended in the present response. Claims 13-20 and 25-32 remain pending in the case. Further examination and reconsideration of the presently claimed application are respectfully requested.

Section 103 Rejection

Claims 13-20 and 25-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over various combinations of U.S. Patent Application Publication No. 2003/0235983 to Li et al. (hereinafter referred to as “Li”), U.S. Patent No. 5,741,362 to Kobayashi (hereinafter “Kobayashi”), U.S. Patent No. 5,636,762 to Juhola et al. (hereinafter “Juhola”), U.S. Patent No. 5,368,715 to Hurley (hereinafter “Hurley”) and U.S. Patent No. 4,554,184 to Canestaro et al. (hereinafter “Canestaro”).

To establish a case of *prima facie* obviousness of a claimed invention, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Second, there must be a reasonable expectation of success. As stated in MPEP 2143.01, the fact that references can be hypothetically combined or modified is not sufficient to establish a *prima facie* case of obviousness. See *In re Mills*, 916 F.2d. 680 (Fed. Cir. 1990). Finally, the prior art references must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d. 981 (CCPA 1974); MPEP 2143.03 (emphasis added). Specifically, “all words in a claim must be considered when judging the patentability of that claim against the prior art.” *In re Wilson* 424 F.2d. 1382 (CCPA 1970). Using these standards, Applicants contend that the cited art fails to provide teaching or suggestion for all features of the currently pending claims, and furthermore, cannot be combined or modified to do so. Several distinctive features of the present invention are set forth in more detail below.

None of the cited art, either alone or in combination, provides teaching, suggestion or motivation for a system comprising an intermediate tank interposed between a chamber and a storage tank, where the intermediate tank has a larger volume capacity than the chamber and a smaller volume capacity than the storage tank. Independent claim 13 has been amended to state that the plurality of tanks comprise a storage tank and an intermediate tank that is interposed between the chamber and the storage tank. The intermediate tank is described as having a larger volume capacity than the chamber and a smaller volume capacity than the storage tank. The decreasing volume capacity from storage tank, intermediate tank and process chamber minimizes the advancement of fluid decomposition and makes it easier to change the temperature of the process fluid within tanks having smaller volume capacities (Specification -- pg. 11, lines 1-12). As set forth below, Li, Canestaro, Kobayashi, Juhola, and Hurley each fail to provide teaching or suggestion for the intermediate tank as presently claimed. In addition, the cited references fail to provide the motivation necessary for one skilled in the art to combine or modify their respective teachings. As a consequence, the cited references cannot be relied upon to disclose all limitations of present claim 13.

Li discloses an electroless plating system including a processing chamber (plating chamber 120), an intermediate tank (pre-heat tank 110) and a storage tank (holding tank 100) (Li -- Fig. 1). Although Li suggests that plating chamber 120 may be smaller than holding tank 100, Li explicitly teaches that plating chamber 120 is about the same size as pre-heating tank 110 (Li -- ¶¶ 0044, 0046). As such, Li fails to provide teaching, suggestion or motivation for the presently claimed intermediate tank, which has a larger volume capacity than the chamber and a smaller volume capacity than the storage tank.

The Examiner agrees that teaching or suggestion for the claimed differences in volume capacity cannot be found within Li. For example, the Examiner admits that although Li mentions one tank (i.e., pre-heating tank 110) having a smaller volume capacity than another tank (i.e., holding tank 100), Li fails to disclose that the same tank (i.e., pre-heating tank 110) has a larger volume capacity than the chamber (i.e., plating chamber 120) (Office Action -- p. 3).

However, the Examiner suggests that the teachings of Canestaro can be combined with Lee to overcome the deficiencies therein. For example, the Examiner states that “Li teaches using an intermediate tank [pre-heating tank 110] that is smaller in volume than the supply or larger tank [holding tank 100], and Canestaro teaches using an intermediate tank [master mixing tank 1] that is larger in volume than the chamber [individual plating baths C1, C2, C3 and C4]” (Office Action -- page 10). The Examiner assumes that one skilled in the art would recognize the benefits of a larger intermediate tank (e.g., avoiding large local chemical changes in the plating chambers) and, thus, would be motivated to use the larger intermediate tank of Canestaro within the plating system of Li (Office Action -- page 4). Applicants disagree for at least the reasons set forth below.

Li uses an “intermediate tank” (pre-heating tank 110), which is about the same size as the processing chamber (plating chamber 120) (Li -- ¶¶ 0014, 0044, 0051), whereas Canestaro uses an “intermediate tank” (master mixing tank 1), which is significantly larger (e.g., about 5 to 40 times larger) than the processing chamber (Canestaro -- col. 4, lines 12-58). The Examiner suggests that a skilled artisan would be motivated to use the larger intermediate tank of Canestaro within the plating system of Li. Applicants do not agree. Li discloses a plating system that appears to work best when using an intermediate tank, which is about the same size as the processing chamber. For instance, Li discloses a processing method that removes a portion of bath solution (e.g., less than 25%, 15% or 10% of the total bath solution) from holding tank 100, pre-heats the portion in pre-heating tank 110, and delivers the portion to plating chamber 120 (Li -- ¶¶ 0014). Li emphasizes the benefits of heating only a small portion of the bath solution at any one time, including reduced energy requirements of the system and extended life of the bath solution (Li -- ¶¶ 0032). Throughout his disclosure, however, Li never once indicates that a significantly larger “intermediate tank” could be used to achieve the same results or advantages. Without such indication or motivation, Applicants contend that a skilled artisan would not be motivated to use the significantly larger master mixing tank (the alleged “intermediate tank”) described by Canestaro within the plating system of Li.

Applicants recognize that the strongest rationale for combining references is the recognition that some advantage or expected beneficial result would have been produced by the proposed combination (MPEP 2144). The Examiner attempts to rationalize the combination by suggesting that “one in the art would immediately recognize that an intermediate tank that is larger than the

coating or plating chamber would avoid large local chemical changes and minimize or eliminate the need to respond to large changes.” (Office Action -- page 4 citing Canestaro at col. 4, lines 48-51). However, the Examiner fails to recognize that Li provides these same advantages by using a larger holding tank and an intermediate tank which is roughly the same size as the plating chamber.

In other words, both references avoid the problems mentioned above by using smaller plating chambers and at least one tank, which is significantly larger than the plating chamber. Li uses a larger holding tank 100, while Canestaro uses a larger master mixing tank 1. However, the end result is the same, in that Li and Canestaro each provide a plating system that improves uniformity of deposition, at least in part, by using a smaller plating chamber to avoid large chemical changes in the plating chamber. Since each reference provides the same advantage, there is no advantage or expected beneficial result that would be produced by combining the teachings of Li and Canestaro. As a consequence, no motivation exists to make the proposed combination.

Furthermore, the teachings of Juhola, Kobayashi, and Hurley cannot be combined with those of Li and/or Canestaro to overcome the deficiencies therein. For example, Juhola, Kobayashi, and Hurley each fail to provide teaching, suggestion, or motivation for an intermediate tank having a larger volume capacity than a chamber and a smaller volume capacity than a storage tank, as presently claimed. As such, even if Juhola, Kobayashi, and Hurley were combined with Li and/or Canestaro, the combined teachings of the cited art would still fail to disclose all limitations of present claim 13.

None of the cited art, either along or in combination, provides teaching, suggestion or motivation for a system having a set of valves coupled to a first set of pipes for circulating process fluid between a storage tank and an intermediate tank, depending on an operating mode of the valves. Amended independent claim 27 recites in part:

A system, comprising: a chamber configured to process one or more wafers for the fabrication of microelectronic devices ... a storage tank configured to hold the process fluid; an intermediate tank interposed between the chamber and the storage tank ... wherein the intermediate tank has a larger volume capacity than the chamber and a smaller volume capacity than the storage tank ... a first set of pipes configured to transport the process fluid from the storage tank to the intermediate tank; a set of

valves coupled to the first set of pipes for circulating the process fluid between the storage tank and the intermediate tank, depending on an operating mode of the valves

...

Support for the amendment may be found, e.g., in originally filed claim 26, Figs. 1a-1c, and pages 11 and 20-21 of the specification. As such, the amendment made to claim 27 does not introduce new matter.

As noted above, the system recited in claim 27 includes a first set of pipes 28 (Fig. 1a), which is configured to transport the process fluid from storage tank 26 to intermediate tank 24, and a set of valves 48 coupled to the first set of pipes for circulating the process fluid between the storage tank and the intermediate tank, depending on an operating mode of the valves. As set forth on pages 20-21 of the specification, the recirculation of process fluid between the storage tank and the intermediate tank may be advantageous for keeping the composition of the process fluid homogenized and/or within a specified temperature range. As set forth below, Li, Kobayashi, and Canestaro each fail to disclose, and cannot be combined or modified to disclose, the set of valves recited in present claim 27.

Li and Canestaro each use a first set of pipes for transporting process fluid from a storage tank to an intermediate tank. For example, Li teaches that the bath solution from holding tank 100 may be transported to pre-heating tank 110 via line 105 (Li -- ¶¶ 0042, Fig. 3). In addition, Canestaro teaches that the various constituents of the plating bath may be supplied, presumably from various supply tanks (not shown), to master mixing tank 1 via conduits 2 (Canestaro -- col. 2, lines 40-50, Fig. 1). However, neither reference provides teaching, suggestion, or motivation for coupling a set of valves to the first set of pipes, so that the process fluid may be circulated between the storage tank and the intermediate tank, depending on a mode of operation of the valves. Although Kobayashi describes a wafer treating apparatus having a treating tank 1 and an attached outer tank 2 for receiving chemical overflow from the treating tank, Kobayashi fails to provide teaching, suggestion or motivation for the presently claimed set of valves and, thus, cannot be combined with Li and/or Canestaro to overcome the deficiencies therein. As a consequence, Li, Canestaro, and Kobayashi fail to provide teaching, suggestion, or motivation for all limitations of present claim 27.

For at least the reasons discussed above, Applicants believe the cited references each fail to provide teaching or suggestion for all limitations of present independent claims 13 and 27. Accordingly, Applicants believe claims 13 and 27, as well as all claims dependent therefrom, are patentably distinct over the cited references. Therefore, Applicants respectfully request removal of this rejection.

CONCLUSION

This response constitutes a complete response to all of the issues raised in the Office Action mailed November 23, 2007. In view of the amendments and remarks herein, Applicants assert that pending claims 13-20 and 25-32 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees, which may be required, or credit any overpayment, to Daffer McDaniel LLP Deposit Account No. 50-3268.

Respectfully submitted,

/Mollie E. Lettang/
Mollie E. Lettang
Reg. No. 48,405
Agent for Applicants

Customer No. 35617
Date: February 22, 2008
JMF